Date: **June 14, 2006**

COSHAC
Agenda Item No. 7(E)

To: Honorable Chairman Joe A. Martinez
and Members, Board of County Commissioners

From: George M. Burgess
County Manager

Subject: Emergency Communications Infrastructure

BACKGROUND

Miami-Dade County plays a vital role in the planning for emergency mitigation, preparedness, response, and recovery efforts for over 2.3 million residents of our community. With thousands of County employees prepared to respond to emergency situations in a variety of roles, having effective and reliable communications systems is essential to quickly mobilize and respond to the challenges present in the aftermath of events such as hurricanes. Just as crucial, having strong radio interoperability capabilities greatly enhances coordination between all the agencies that respond to emergency situations.

On May 9, 2006, the Board of County Commissioners (BCC) approved resolution R-570-06, which was placed on the agenda at the request of Vice Chairman Moss. The resolution directed the County Manager to develop a plan to improve the County's emergency communications infrastructure with respect to disaster response and recovery efforts, to be presented within sixty (60) days of the resolution's approval.

The Enterprise Technology Services Department (ETSD), the department primarily responsible for emergency radio and telephone communications infrastructure in the County, works closely with the Office of Emergency Management, first responders, and county administration, in all planning efforts associated with emergency mitigation, preparedness, response and recovery. The department also has coordination responsibilities with the Cellular service providers. The report and plan that follow, address our capabilities and actions that have been taken or that are in the process of being completed as a result of lessons learned from Wilma. Additionally, the report highlights the needs that must be met in the longer term to accomplish the County's sustainability and interoperability goals.

RADIO COMMUNICATIONS INFRASTRUCTURE

The County's Radio Communications infrastructure is a redundant and reliable high-speed network providing voice communications over 800 MHz and UHF frequency bands. The system is fault-tolerant, providing the ability to continue operation in the event of unexpected hardware or software failure. The frequencies provide coverage across the County from two (2) discrete but interoperable radio systems.

The 800 MHz system is used by several County departments while the UHF system, which is currently operational but still undergoing an upgrade implementation, is used exclusively by the Fire Department.

The County's Radio Communications System is designated as the principal system used for direction and control activities. Principal users include the following:

1. Law Enforcement
2. Fire Department and Emergency Medical Services
3. Emergency Management
4. Medical Facilities
5. Public Works
6. Public Transportation

The following describes the Radio Infrastructure, damage sustained as a result of Wilma, as well as short and long term actions and initiatives:

➢ **800 MHz Radio Infrastructure**

The 800 MHz radio system manufactured by M/A-Com has five (5) incremental back-up levels to maintain on-air coverage.

- **Damage from Wilma**

  - High winds brought down antenna feed lines mounted on towers, damaged several antennas and shifted microwave dishes from original positions, causing signal misalignment. Operational backup procedures were executed to mitigate coverage issues. It is important to note that radio communications availability was never lost during the storm, rather we experienced reduced in-door coverage resulting from the dish misalignments. Corrective actions were taken and within 72 hours operations were back to normal.

  - The generator system at Miami Internal Airport (MIA) ran out of fuel because Airport maintenance personnel were unavailable to refuel. Radio coverage at MIA was affected for over twelve (12) hours.

- **Short Term Actions**

  - Repair to the damaged components has been completed. Additionally, during the last twelve (12) months, ETSD has been performing a thorough inspection and a comprehensive audit of the nine (9) County owned towers to determine structural conditions of the tower, equipment shelter, microwave and base station antennas, transmission lines and radio equipment. Tower crews were hired to inspect each tower and an engineering firm was also engaged to complete the assessment. Based on the assessment, corrective and preventative actions were taken.

  - Airport contact and response procedures were modified to include refueling of the radio system onsite.

  - Fuel agreements with vendors are in place to provide fuel to radio sites. GSA will provide backup support if fuel delivery from vendors is delayed. As part of the State Disaster Contingency, we are also able to request a 5,000 gallon fuel truck delivered to the County within forty-eight (48) hours in the event fuel from local sources is not available.

- **Long Term Actions in preparation for 2007 Hurricane Season**

  - Plans are underway to acquire two (2) mobile radio towers that can be deployed immediately to any location to restore radio communications in the area.

  - We are planning for the replacement of a 20 year-old converted RV trailer used for strategic deployment during emergencies. The new vehicle will be equipped with a full radio system, phone switch, video equipment, and data network to restore communications at the damaged facility in the event that one is damaged during a storm.

  - Work with FPL to bring a separate power feed-line from a secondary substation to the main radio site (TCC), to provide redundancy.

  - Replace the existing microwave system. The existing system has exceeded its life expectancy and is unable to meet the future requirements to carry high speed data and voice. The replacement will provide greater redundancy in case of commercial power outages during emergencies. The Fire Department is expected to be the first user of the system.

➢ **UHF Radio Infrastructure**

The UHF radio system is manufactured by Motorola. The coverage of primary dispatch channels is geographically distinct with some overlap, and adjacent channels can be used to partially backup another. Full backup capabilities will be in place with the completion of the UHF upgrade, which is projected for completion in April 2007.

- **Damage by Wilma**

  - High winds damaged and shifted several antennas from original positions thus causing signal misalignment.
  - Several copper T-1 telephone lines failed due to lack of power. Power outages exceeded the eight (8) hour battery backup capability at each site.

- **Short Term Actions**

  - Damaged antennas were replaced and others were re-aligned.
  - Circuit cards in Channel banks have been improved to withstand power fluctuations better.
  - The Fire Department has acquired its own fuel pump truck to fuel onsite generators.
  - Upgrades to twenty (20) sites, primarily owned by the County, have been completed to harden the facilities to better withstand high winds, improve grounding, and have better battery backup capabilities. Permits are being pulled for the remaining nineteen (19) sites, with completion expected in the next 3-6 months.
  - Completed installation of five (5) self-supporting monopoles towers, which provide greater coverage.

- **Long Term Actions In Preparation for the 2007 Hurricane Season**

  - The ongoing implementation of the UHF project will provide greater coverage and reliability as the project is completed. Estimated completion date is April 2007.
  - Fiber Optic options are being considered to replace copper facilities. The service is more reliable overall, and does not require having batteries at customer site. In addition, the higher level of service is monitored 24/7.
  - Following installation of additional T-1 lines, radio coverage in the north end will be increased by August 2006.
  - The Fire Department plans to exercise the Microwave Option of the Motorola contract prior to October 2006. This option is the first deployment of the countywide microwave system that will be upgraded in the future, providing greater redundancy.

REBANDING/RADIO INTEROPERABILITY

Users of the 800 MHz radio frequency band, including Miami-Dade County, have been ordered by the FCC to reconfigure their operations by engaging in a frequency "swap" with Nextel, to eliminate interference experienced in the band. The elimination of the current interference will provide for more effective communication during emergencies. It is anticipated that a portion of the transmitters, receivers, repeaters, and subscriber radio devices in operation would not be re-tunable to the new frequencies and will, therefore, be replaced as part of the re-banding effort. The cost for the frequency reconfiguration will be fully paid by Nextel, consistent with the FCC order.

While approximately 50% of the radio infrastructure will not be affected by the re-banding effort, the County is presented with an opportunity to also upgrade this equipment to meet greater interoperability capabilities. Conducting the upgrade to this equipment, in conjunction with the re-banding effort, will result in savings and efficiencies that will not be available if the two projects are not implemented concurrently. The County will, therefore, seek to upgrade to the new interoperability technology standard, which is known as Project 25 (P-25), as it reconfigures the 800 MHz frequencies. P-25 has been specified by the Department of Homeland Security as the preferred standard to support federal grant funding for interoperability, and enjoys support by industry, government agencies and public safety communications officials. The cost for the P-25 upgrade is estimated at between $20,000,000 and $30,000,000. We are currently seeking funding sources for this initiative.

Since 1997, Miami-Dade County has been a leader in providing interoperable communications to law enforcement, emergency personnel, and County departments such as Transit, Aviation and the Seaport, as well as to elected officials, who rely on communications in order to manage planned and unexpected events. As described above, the County will be upgrading its radio infrastructure with new technology that provides greater capabilities and ease of use. Therefore, I have directed that Police, Fire and ETSD develop a comprehensive interoperability approach before the start of the 2007 hurricane season, to leverage new technologies and update standard operating procedures as necessary.

CELLULAR COMMUNICATIONS

The unavailability of wireless communication represents a hindrance to recovery efforts and can even affect continuity of operations. In the immediate aftermath of Hurricane Wilma, cellular communication service was very limited, and this created restrictions on the ability of County staff to quickly communicate with one another.

The situation gradually improved as the affected service providers were able to remediate system failures in the days following the storm event, but in some cases the heavy call volumes also affected the ability to effectively communicate on these private networks.

As a lesson learned from Wilma, the County has been enrolled in a Wireless Priority Service (WPS) program. WPS is a White House-directed program, under the Department of Homeland Security, which provides for priority cellular network access to improve the probability for a user completing calls during periods of wireless network congestion.

The priority levels are defined as:

1. National Executive Leadership and Policy Makers
2. Disaster Response/Military Command and Control
3. Public Health, Safety, and Law Enforcement Command
4. Public Services, Utilities, and Public Welfare
5. Disaster Recovery

Understanding that the County relies on the wireless infrastructure owned and serviced by private networks, during emergency recovery operations, it became apparent that the best option for the County was to establish a contract for wireless services that would be most likely to meet its needs during emergency recovery operations, with a single service provider. This approach is also attractive in that it positions the County to request the closest cooperation and coordination in the wireless arena, and permits the selection of the wireless network solution that is deemed best in sustaining coverage and service in our area during and in the aftermath of hurricane events.

Therefore, an ongoing contracting effort to provide the County with its own wireless service contract has been refocused. Working with Police and Fire, ETSD has submitted specifications to the Department of Procurement Management (DPM) to issue an RFP that would rank coverage and sustainability as important selection factors, in addition to other considerations, such as price.

Primary Goals of the RFP include:

- Reliable Service – Contracting with a vendor that can be expected to provide a high level of reliable cellular service, both during normal operations and in the aftermath of major disasters, such as hurricanes.

- Sustainable Service – Successful vendor will be required to reserve up to six portable cellular towers, for deployment following a natural disaster, in designated areas as directed by the County's Emergency Operations Center.

- Emergency Coordination – Requirement for the vendor to be present at the Emergency Operations Center, for coordination of service requirements, prioritization of needs and service restoration.

- Cost Effectiveness – A single vendor often can better position itself to provide its best options to our government if it is the complete or major business partner to the County. Having a single wireless carrier for voice, push to talk and data for most of our cellular communication needs, the approach will likely result in savings and discounts.

Due to the contract's public safety dimension, ETSD has requested that the award process be prioritized by the Department of Procurement Management.

WIRED-LINE SERVICES

ETSD, working with the concerned departments, has updated the registration of critical County voice and data circuits for Miami-Dade County Emergency Operations Center, Police, Fire, Corrections and Rehabilitation, Water & Sewer, Medical Examiners, Seaport, Public Works, and General Service Administration under the Telecommunications Service Priority (TSP) program. The program is operated by Priority Telecommunications section, with the National Communication Systems under the US Dept. of Homeland Security. Once circuits are registered and approved, ETSD will work with our local partner BellSouth, whom in turn, will update their records to ensure that the County voice and data circuits receive priority restoration immediately following an emergency or storm event.

SUMMARY

In the short term, the lessons learned in the aftermath of Wilma allowed the County to work internally and with its partners to institute measures designed to sustain service to the highest degree possible in case of hurricane events. In the radio infrastructure area, steps taken focused on the sustainability of backup power generation, as well as improvements and upgrades to the radio tower sites. For telephone communications, ETSD established priority cellular service for the County Administration, and has worked to update the priority restoration service available for telephone and data communication land-lines.

As described in the plan, in order to provide the County with the best opportunity for sustainable service and emergency coordination efforts in case of emergency, initiatives have been undertaken to acquire additional portable radio communication transmission equipment and to enter into a partnership with a single cellular service carrier.

As a key initiative in the longer term, in conjunction with the 800 MHz frequency reconfiguration effort, we are requesting enhancements to the radio system infrastructure to provide the highest level of interoperability protocol compliance available, which is fundamental to provide rapid and effective remediation efforts in case of emergency. Our success will depend on all stakeholders having a high level of commitment, as well as close coordination between all the participating departments and agencies.

Judi Zito, Chief Information Officer